Observation of Cellular Dynamics with Polarized Light

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Abstract

Polarization-sensitive measurements reveal valuable information about biological samples by analyzing the light's response after interacting with them. In this study, we investigated in-vivo cellular dynamics of cervical cancer cell lines using two distinct experimental setups. The first setup involved an Olympus IX50 inverted microscope coupled with a pixelated polarization camera to observe temporal variations. The second implementation featured a custom-built inverted microscope incorporating two rotated polarizers to enhance polarization sensitivity. We analyzed two key cellular dynamics. The first focused on changes in cell volume induced by osmotic stress, while the second examined cellular migration during wound-healing, where a gap in the cell monolayer was induced and subsequently observed.

These approaches demonstrate the potential of polarized light in studying complex cellular processes and their temporal evolution.

Short Bio

David Serrano received his Ph.D. in Optical Sciences from the Optical Research Center (CIO) in Mexico in 2014. From 2014 to 2017, he occupied a postdoctoral position at the Center for Optical Research and Education (CORE) at Utsunomiya University in Japan. Since 2018 he has been a research professor at Guadalajara University in Guadalajara, Jalisco, Mexico. His research interests cover phase dynamics measurements by employing interferometric techniques and related polarization measurements based on Jones and Mueller matrix approaches. Since 2014 David has been a level I at the National System of Researchers of CONACYT in Mexico and, in 2022, was promoted to a Senior Member level in the OPTICA society.